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its action upon a point of the wheel's circumference, which is about fifty-three degrees distant from the vertex, or the highest point thereof, instead of applying it at the top of the wheel, as heretofore commonly practised for overshot wheels. By these means I can have the advantages of a large wheel, in situations where the fall would only allow of a smaller, if the water was applied at the top; thus, if there be a perpendicular of twelve feet, I cause a wheel of fifteen feet diameter to be made, and of course the water must be made to act upon it at a height of twelve feet, which is three feet perpendicular below the top of the wheel, and at about fifty-three degrees from the top, measured round its circumference, as above stated. I make the pentrough which brings the water to the wheel of such a form that it delivers the water from the bottom of it through the floor, and is directed at such an angle as to fall into the buckets nearly in the direction of the wheel's motion, which will be at an angle of seventy-five degrees with the horizon; the shuttle, or gate slides upon the floor of the trough, so as to cover the aperture, and determine the quantity of water to be let out upon the wheel.

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*Specification of the Patent granted to John Morgan, of York-street, in the city of Dublin, M.D.; for a new power applicable to the propelling of vessels and boats of every description through the water, and also to the pumping of them. Dated December* 21, 1812.

I, the said John Morgan do hereby describe and ascertain the nature of my said invention, in manner following: that is to say: To some convenient part or place, or parts or places, of, in, or appertaining to the said vessels or boats, or either of them, I do annex or affix one or more bar or bars, beam or beams, out-rigger or out-riggers, of wood, or other fit material, in such manner as that one of the extremities, called the outer extremity, of each of the said several bar or bars, beam or beams, out rigger or out-riggers, shall be without the said vessels or boats, or any or either of them; and the other of the said extremities, called the inner extremity, shall be within the said vessels or boats, or any or either of them, or nearly so; and that each of the said bar or bars, beam or beams, out-rigger or out-riggers, shall, by means of a joint, or other well-known mechanical contrivance, of the nature of an hinge or horizontal cross axis, or other manner or mode of suspension, at or near the inner extremity thereof, be capable of being moved up and down, as to the outer extremity thereof, in the manner of an arm or lever.

And, farther, I do annex or affix unto each of the said outer extremities a block, or buoy, or floating piece, and I do allow and suffer the same to bear and float in and upon the external water, and thereby to produce a tendency to rise and fall, or an actual rise and fall of and in the said outer extremities, by the re-action of the waves, and of the respective weights or buoyancy of the said blocks, buoys, or floating pieces, or to afford either an absolute or a relative motion or change of situation in the said blocks, buoys, or floating pieces, by reason of the rolling or pitching, as well as of the rise and fall of the said vessels or boats respectively, in or upon the subjacent and surrounding water, and the waves and swell thereof.

And, farther, I connect the said bar or bars, beam or beams, out-rigger or out-riggers, by means of arms, wheels, pinions, blocks, sheaves, pullies, ropes, bands, or other well-known mechanical organs, instruments, or gears, unto and with the ordinary and well-known apparatus or machinery for propelling the said vessels or boats, or for pumping, or performing, or effecting, any other needful and suitable mechanical work, within, about, or concerning the said vessels or boats. And I do accordingly, by means of such and the said connection, and of the power so generated, produced, or communicated in, by, or through the said bar or bars, beam or beams, out-rigger or out-riggers, propel the said vessels or boats, or do pump them, or do perform and effect other needful and suitable mechanical work within or at the same as aforesaid.

### *Observations by the Patentee.*

It may not be improper to illustrate the effect of the means described by an example. To the vessel let the float be attached by the out-rigger or frame. The frame turns freely at its inner extremity, on the uprights or timbers of the vessel. When the stern of the vessel is in the hollow of the sea, the float will thus be raised to the top of the contiguous wave. When, on the contrary, the stern of the vessel is raised to the top of the wave, the float will sink into the hollow of the sea. The position of the float, with respect to the vessel is thus continually changing. Two changes of position occur on the passage of each wave; first, when the stern of the vessel is raised, and, secondly, when it is depressed. In the former case the float descends absolutely and relatively with respect to the vessel, and may be made to act as a power by its weight: in the latter it ascends, and may be made to act by its buoyancy. If the specific gravity of the float be no more than half that of water, it will have in its ascent the same effect by its buoyancy as in its descent by its weight.

Let the vessel be supposed thirty feet long and ten feet wide, and the waves, such as they occur in moderate weather, about fifty feet broad and five feet high. When it blows hard they are of much greater magnitude, and the power generated by their means is consequently far more considerable. Such a wave as is described passes through a space equal to its own breadth in four seconds. A boat of the foregoing dimensions, if it have a flat bottom, will have sufficient stability to allow a float of 2000 pounds weight to be adapted to it at the distance of fifteen feet. The stern of the boat as it rises will be depressed nearly a foot below the usual water-line by the float, and as it falls will be as much elevated above this line by the buoyancy. The float also acts by its weight only when it is raised above its water line, and by its buoyancy only when depressed below it. The distance between the two positions which, were it not for these circumstances, would be about twelve feet, is thus reduced nearly to six. The power then is equal to a weight of 2000 pounds falling through a space of six feet every two seconds, and consequently equivalent to 100 men, or seven horses. But a boat of the dimensions specified is no larger than a common life-boat, which may be rowed by ten men against the waves in a storm. Nor is the case described, that in which the means proposed are employed with most advantage. It is chosen merely because it furnishes a direct comparison of their effect with that of the means in use, and as being, by its simplicity, best adapted to the purpose of illustration. All its circumstances, the position, number, and weight of the floats, as well as the size of the vessel and magnitude of the waves, might be conceived changed with advantage. But a description of these particulars, as well as of others connected with the subject, is precluded by the limits prescribed to observations of this kind.

The power is most conveniently, although not most advantageously, applied to raise water to a reservoir, or to force it into an air vessel; which water being allowed to escape, by an aperture at the stern of the boat, an impulsion is given on the same principle, that motion is communicated to the mill called Barker's Mill. Even in this way of employing the power, a greater velocity may be given to the boat described, moving against the waves, than it is capable of receiving from sails moving before them. The floats may be lightly constructed, and the proper weight given to them by water, which, when circumstances require them to be taken into the vessel, may be previously discharged.

The pumps intended to be worked by means of floats, are best placed close to the side, or between the timbers of the vessel; in which situation the inner extremity of the bar or lever may be more directly connected with the piston rods. The farther the outer end of the bar and float extends from the side of the vessel, and towards or beyond the stern, the greater will be the effect. A float of 200 pounds weight, and of equal buoyancy, in an ordinary sea, will do the work without intermission of at least four men, and consequently, even supposing only four gangs required to keep the pumps at work night and day, will be equal to the labour of sixteen men. The number of floats may be increased as circumstances require. When the vessel does not require pumping, the float, without being unshipped, may be drawn up, and made fast to the vessel's side or quarter.

### *Temporary Scaffold, by means of which the outside walls of houses may be repaired or beautified with equal safety and at less expense than usual; by Mr. Joseph Davis, of Catharine-street, Strand.*

(From the Transactions of the Society for the encouragement of Arts, Manufactures, and Commerce.)

Having to repair and beautify the front of my house, which is called the Minor-Theatre, in Catharine-street, Strand, I invented a machine, which answers for such purposes much better than a scaffold, and saves considerable expense. As I con-